

Section 1

Cardiovascular Diseases

pg. 602-608

Objectives

- **List** six types of cardiovascular disease.
- **Describe** the ways in which cardiovascular disease is detected and treated.
- **Identify** risk factors for cardiovascular disease and ways to lower your risk.

Vocabulary

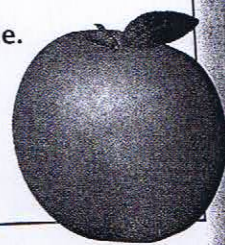
- chronic disease
- cardiovascular disease
- angina pectoris
- heart attack
- fibrillation
- stroke
- cerebral hemorrhage
- aneurysm

Warm-Up

Quick Quiz Complete each of these statements with *always*, *sometimes*, or *never*.

- ① I ? eat foods rich in vitamins, minerals, and fiber, and I ? avoid foods high in saturated fats and salt.
- ② I ? exercise on a regular basis.
- ③ I ? avoid tobacco products and alcohol.
- ④ I ? include relaxation time in my schedule.

WRITING Predict how your behavior may affect your chances of developing cardiovascular disease.



Types of Cardiovascular Disease

In the United States today, the leading causes of death are not infectious diseases. Instead they are **chronic diseases**, diseases that persist for a long period or recur throughout life. Chronic diseases are usually caused by risk factors that are behavioral, environmental, or hereditary—not by pathogens. The most common chronic diseases are **cardiovascular diseases** (KAHR dee oh vas kyuh lur), which are diseases of the heart (cardio) and blood vessels (vascular). **Cardiovascular diseases include hypertension, atherosclerosis, heart attack, arrhythmia, congestive heart failure, and stroke.**

Hypertension A person whose blood pressure consistently measures 140/90 or higher has hypertension, or high blood pressure. Since many people experience no obvious symptoms, hypertension frequently goes undetected and is known as the “silent killer.” The only way to know if you have hypertension is to have your blood pressure measured.

Over time, hypertension can lead to heart disease. This is because the increased blood pressure puts a strain on the heart and blood vessels. Hypertension can be controlled with behavior changes and medications.

Nearly one out of three American adults has hypertension, and the number of teens with hypertension is on the rise. You can reduce your risk of developing hypertension by exercising regularly, maintaining a healthy weight, reducing stress, and eating foods that are low in sodium.

Atherosclerosis Atherosclerosis (ath uh roh skluh ROH sis) is a disease in which fatty substances, including cholesterol (kuh LES tur awl), build up inside artery walls. These deposits, called plaque (plak), cause the artery walls to thicken and narrow, as shown in Figure 1. As it becomes more difficult for blood to flow in the narrowed vessels, blood pressure rises.

A diet high in saturated fats can increase your risk of developing atherosclerosis. This is because saturated fats tend to increase levels of cholesterol in the blood. Other major risk factors include a family history of heart disease, smoking, diabetes, obesity, and lack of exercise.

Atherosclerosis can also increase your risk of developing other cardiovascular conditions.

► **Arteriosclerosis** People who suffer from atherosclerosis often have arteriosclerosis (ahr teer ee oh skluh ROH sis) as well. Arteriosclerosis, or hardening of the arteries, develops when arteries lose their elasticity and become stiff.

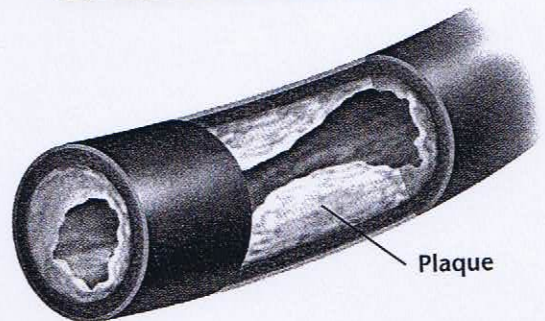
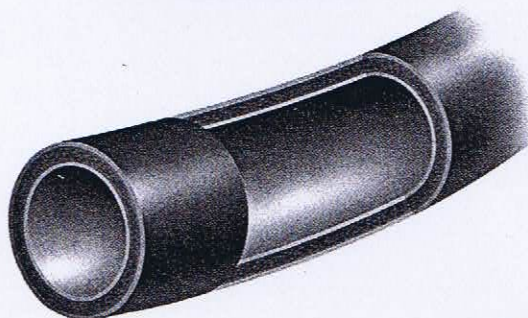
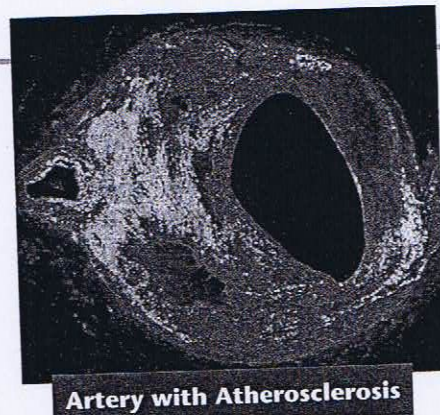
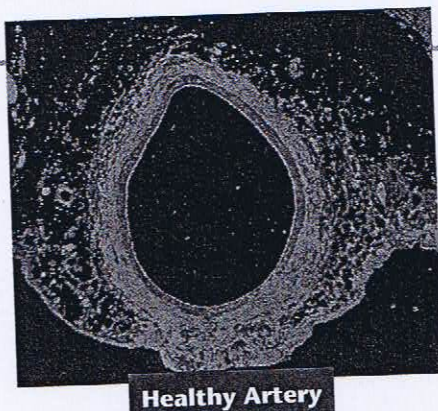
► **Coronary Heart Disease** When atherosclerosis starts to develop in the arteries that supply blood to the heart, it can lead to coronary heart disease. As the coronary arteries narrow, blood flow to the heart decreases. **Angina pectoris** (an JY nuh PEK tur is) is the chest pain that occurs when an area of the heart does not get enough oxygen-rich blood. Coronary heart disease can lead to a heart attack.



How do your exercise habits affect your chances of developing atherosclerosis?

FIGURE 1 An artery with atherosclerosis offers more resistance to blood flow than a healthy artery. This increases blood pressure and causes the heart to work harder.

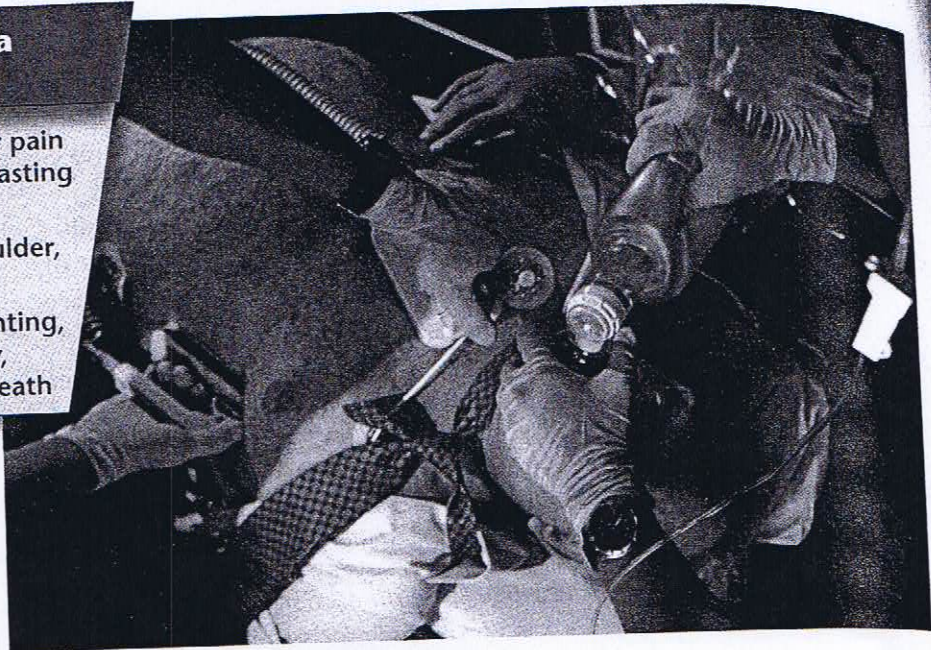
Relating Cause and Effect What kind of eating habits could lead to atherosclerosis?



Warning Signs of a Heart Attack

- ▶ Uncomfortable pressure or pain in the center of the chest lasting for two minutes or longer
- ▶ Pain spreading to the shoulder, neck, or arms
- ▶ Severe pain, dizziness, fainting, sweating, extreme anxiety, nausea, or shortness of breath

FIGURE 2 Learn to recognize the warning signs of a heart attack. Automated external defibrillators, located in public places such as malls and airports, can help save a heart attack victim's life.



Heart Attack A heart attack occurs when some of the tissue in the heart doesn't receive its normal blood supply and dies. The cause is usually a blood clot that forms in a coronary artery that has been narrowed by atherosclerosis. The clot blocks blood flow to the heart. The more heart tissue that dies due to lack of oxygen, the more severe the heart attack.

Each year, over a million people in the United States suffer a heart attack. Of those people, about 500,000 die. Figure 2 lists the warning signs of a heart attack. Immediate medical attention can mean the difference between life and death.

Four major risk factors for heart attacks are high blood pressure, high levels of cholesterol in the blood, physical inactivity, and smoking.

Arrhythmia Irregular heartbeats, or arrhythmias (uh RITH mee uhs), are another form of heart disease. The heart may beat too slowly or too quickly, or with an uneven rhythm. Arrhythmias may result from damage caused by a heart attack, or they may develop spontaneously. **Fibrillation** (fib ruh LAY shun) is a life-threatening arrhythmia in which the heart twitches rapidly in an uncoordinated fashion. Some abnormal heartbeats can be controlled by medications. Others require surgery to implant an artificial pacemaker.

Congestive Heart Failure Unlike a heart attack, congestive heart failure is not a single event. Instead it is a condition in which the heart slowly weakens over time. Usually, years of atherosclerosis and high blood pressure can lead to congestive heart failure. As the heart weakens, it is unable to pump as much blood as it once did. Swelling of the feet and lower legs is a symptom of congestive heart failure. Drugs that relax blood vessels and decrease the strain on the heart may be used to treat congestive heart failure.

Stroke A **stroke** is a sudden disruption of blood flow to part of the brain. Strokes can occur when an artery that supplies blood to an area of the brain is blocked. The blockage may be caused by atherosclerosis or by a blood clot.

Strokes also can occur when a weakened artery in the brain bursts, flooding the area with blood. If the burst artery is located in the cerebrum, the main portion of the brain, the stroke is called a **cerebral hemorrhage** (suh REE brul HEM ur ij). Cerebral hemorrhage may also be caused by a head injury or by an aneurysm that bursts. An **aneurysm** (AN yuh riz um) is a blood-filled weak spot that balloons out from the artery wall.

Without a supply of blood, brain cells soon die from lack of oxygen. The effects of a stroke depend on its location and severity.

- ▶ Brain damage from a stroke can affect the senses, speech, comprehension, behavior, thought patterns, and memory.
- ▶ Paralysis on one side of the body is common. Many people who survive a stroke become severely disabled. Sometimes normal function can be regained with therapy.
- ▶ Over one third of stroke cases result in death.

Each year in the United States, more than 750,000 people experience a stroke. Risk factors for stroke include high blood pressure, high blood cholesterol, smoking, excessive use of alcohol, physical inactivity, and obesity. Figure 3 lists some of the warning signs of a stroke.



List some ways you can lower your risk for a stroke.



Cerebral hemorrhage

FIGURE 3 A blockage or break in an artery in the brain can cause a stroke. A person who experiences any of the warning signs of a stroke should seek prompt medical attention.

Warning Signs of a Stroke

- ▶ Sudden, severe headache with no apparent cause
- ▶ Sudden weakness or numbness of the face, arm, or leg on one side of the body
- ▶ Loss of speech, trouble talking, or trouble understanding speech
- ▶ Sudden dimness or loss of vision, particularly in one eye
- ▶ Unexplained dizziness, nausea, unsteadiness, or sudden falls

Top View of Brain

Treating Cardiovascular Disease

Cardiovascular diseases cannot be cured, but they often can be controlled or prevented from getting worse. There are many medical technologies and surgical methods available for detecting and treating cardiovascular diseases. Some of these are described in Figure 4. In addition, medicines are often used to control cardiovascular diseases. Certain drugs may lower blood pressure, lower cholesterol levels in the blood, or lessen the chance of blood clots forming.

FIGURE 4 There are many testing and treatment options for patients with cardiovascular disease. New technologies are being developed that may replace these methods in the future.

Testing and Treatment for Cardiovascular Disease

Testing Tools

Magnetic Resonance Imaging (MRI)

Magnetic energy is used to produce a clear image of the heart. Doctors can analyze the image for heart damage.



Electrocardiogram (ECG)

Electrodes attached to the skin detect the heart's electrical activity. Abnormalities in heart rhythm or other heart problems are revealed in the recorded pattern.



Echocardiogram

A device that generates sound waves is placed against the chest. The sound waves create a moving picture of the heart. A doctor can evaluate the heart's valves and chambers from the picture.

Arteriography

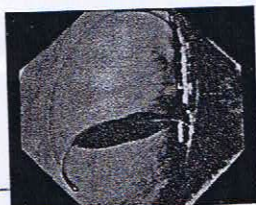
A flexible tube is threaded through an artery in an arm or leg until it reaches the heart. A dye is then released into the coronary arteries, and X-rays are taken. The X-rays can reveal blockages.



Treatment Methods

Balloon Angioplasty

A thin tube with an expandable tip is guided into a coronary artery. As the tip is inflated, it flattens fatty deposits in the artery wall, improving blood flow. Metal structures called stents are sometimes inserted to keep the artery open.

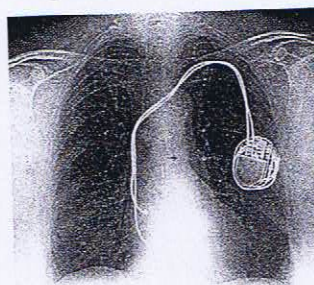


Coronary Bypass Surgery

Surgeons use a vein from the patient's leg or an artificial blood vessel to construct a detour around a blocked coronary artery. This procedure creates an alternate route for blood flow.

Artificial Pacemaker

An artificial pacemaker is a small, battery-operated device that is surgically implanted in the chest. It produces electrical impulses that regulate the heartbeat.



Heart Transplant

When a person's heart cannot function adequately, it may be replaced with a heart from an organ donor. This surgical procedure carries some risk because the immune system may reject the new heart. To lower rejection rates, doctors use drugs to suppress the immune system.



FIGURE 5 Some people inherit a tendency to develop cardiovascular disease. Healthy behaviors are even more important for people with risk factors that they cannot control.

Preventing Cardiovascular Disease

Some risk factors for cardiovascular disease are out of your control. Others are within your control. **Choosing behaviors that lower your risk for cardiovascular disease is important for your health, both now and throughout your life.**

Risks You Cannot Control Certain risk factors for cardiovascular disease are not within your control. If you have any of these risk factors, it is even more important that you practice healthy behaviors to combat cardiovascular disease.

- ▶ **Heredity** Having a family history of certain cardiovascular diseases, such as hypertension, may increase your risk of developing those diseases. It is important to be aware of your family's health history so that you can practice behaviors that may reduce your risk.
- ▶ **Ethnicity** Some diseases strike people of certain ethnicities disproportionately. For example, African Americans and Latinos tend to have higher rates of coronary heart disease.
- ▶ **Gender** Some cardiovascular diseases strike men and women at different rates. For example, men are more likely to suffer heart attacks than women. On the other hand, women are more likely to suffer strokes than men.
- ▶ **Age** As people age, their risk of cardiovascular disease increases. However, more young people today are being diagnosed with cardiovascular disease than ever before.



Which of these factors increase your risk of cardiovascular disease?



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For: More on cardiovascular disease



FIGURE 6 Healthy behavior patterns in your teen years can give you a head start in preventing cardiovascular disease.

Risks You Can Control There are many things you can do to avoid cardiovascular disease. Because the damage to your body can begin when you are young, it is important to develop healthy habits now.

- ▶ **Maintain a Healthy Weight** If you are overweight, your heart has to work harder than it should. Being overweight also raises blood pressure and blood cholesterol levels. Obese adults are more likely to develop diabetes, which is a major risk factor for cardiovascular disease.
- ▶ **Eat a Healthy Diet** Choose a diet that is high in plant products and low in saturated fat and cholesterol. Limit your intake of red meat, high-sodium snacks, and sugary foods, such as soda and candy.
- ▶ **Be Physically Active** Regular exercise strengthens your cardiovascular system and can lower blood pressure.
- ▶ **Manage Stress** Take time to relax each day. Feelings of stress and anxiety can raise blood pressure and contribute to cardiovascular disease.
- ▶ **Monitor Your Blood Pressure** Have your blood pressure checked regularly by a doctor or nurse. If your blood pressure is high, discuss ways to lower it.
- ▶ **Avoid Smoking and Drinking** Do not start smoking. And if you smoke, quit. Smokers have a higher risk of heart attack and stroke than nonsmokers. Excessive alcohol intake can also damage the heart.

Section 1 Review

Key Ideas and Vocabulary

1. Name six types of cardiovascular disease.
2. What is **fibrillation**?
3. What is an **aneurysm** and how can it lead to a stroke?
4. What medical test might be used to detect an arrhythmia? How might an arrhythmia be treated?
5. List four things you can do to lower your risk for cardiovascular disease.

Critical Thinking

6. **Comparing and Contrasting** Distinguish between a heart attack and a stroke.

Health at School

Heart Health Write an advertisement, song, or skit that informs teens about ways to prevent cardiovascular disease. Think about how you can motivate other students to practice healthy behaviors. Present your advertisement, song, or skit to the class. **WRITING**

7. **Applying Concepts** Suppose you have a friend who has a family history of cardiovascular disease. If you noticed your friend eating meals high in saturated fat and salt, what would you say?